

WEDNESDAY 20 AUGUST

8:00 – 8:15: Conference welcome; Churchill Grimes

8:15 – 9: 00: Keynote Presentation: Houde, Edward D
Dancing in Hjort's shadow

THEME SESSION: UNDERSTANDING DISPERSAL, SETTLEMENT, AND RECRUITMENT: GENETICS, OTOLITHS, PHYSICAL PROCESSES, AND APPLICATIONS

Session moderator: Churchill Grimes

9:00: Ralston, Steve
Interannual variability in the reproductive success of some West Coast rockfishes

9:30: Sponaugle, S; Cowen, RK; Paris, CB
Larval encounters with eddies—their effect on the transport, growth and recruitment of coral reef fishes

10:00 - 10:30 Coffee break

Session moderator: Churchill Grimes

10:30: Largier, John L
The importance of swimming in the dispersal of early life stages

11:00: Leis, Jeffrey M
The simplifying assumption is dead! Behaviour of fish larvae as a factor in their dispersal and retention

11:30: Thomas, Michael; Raimondi, Pete
Estimation of effects of larval loss resulting from the operation of coastal power plants: Models, impact assessment and mitigation

12:00 - 1:00 Lunch

Contributed papers (Media theater)

Session moderator: Jenn Caselle

1:00: Armsworth, Paul R; James, Maurice K;
Mason, Luciano B; Bode, Lance
Local and regional scale population dynamic consequences of reef fish larval dispersal

1:15: Paris, Claire B; Cowen, Robert K; Lindeman, Kenyon C; Claro, Rodolfo
Modeling larval transport from grouper (Serranidae) and snapper (Lutjanidae) spawning aggregations in the Mesoamerican region

Contributed papers (Experimental theater)

Session moderator: Joan Holt

1:00: Galbraith, Peter S; Browman, Howard I;
Racca, Roberto; Skiftesvik, Anne Berit; St-Pierre, Jean-Francois
The effect of turbulence on the energetics of foraging in fish larvae

1:15: Islam, M Shahidul; Hibino, Manabu; Ohta, Taro; Ueda, Hiroshi; Tanaka, Masaru
Distribution and feeding habits of dominant fish larvae and juveniles related to a continental relict copepod in Chikugo estuary, Ariake Bay, Japan

Contributed papers (Media theater)

1:30: Cowen, RK; Paris, CB; Purcell, JFH;
Hughes, C
Connectivity among marine populations: model
predictions and genetic results

1:45: Simonsen, CS; Boje, J; Pedersen SA;
Ribergaard, MH
Larval drift, settling and distribution patterns of
Greenland halibut (*Reinhardtius hippoglossoides*) in
the sea off West Greenland.

2:00: Hilwig, Kara D.
Suppression of populations and reproduction in a
nonnative fish: sensitivity of various life history
stages of red shiners to environmental manipulation
(SRA)

2:15: Sullivan, Mark C; Cowen, Robert K
Effects of large-scale oceanographic forcing on
settlement and growth of YOY yellowtail flounder,
Limanda ferruginea, in the New York Bight (SRA)

2:30: Richardson, DE; Cowen, RK
Diversity of leptocephalus larvae around the island
of Barbados: relevance to regional distributions
(SRA)

2:45 – 3:15 Coffee break

Session moderator: Runa Marteinsdottir

3:15: Rutherford, Edward; Beletsky, Dmitry;
Schwab, David; Mason, Doran; McCormick,
Michael; Vanderploeg, Henry; Janssen, John
Modeling the influence of lake circulation on
recruitment variability of yellow perch *Perca*
flavescens in Lake Michigan

3:30: Bjorkstedt, Eric P
To swim or not to swim? Optimal settlement
strategies of early life history stages of reef fishes.

3:45: Fisher, Rebecca
Swimming capabilities of tropical reef fish larvae
could facilitate active self-recruitment

Contributed papers (Experimental theater)

1:30: Searcy, SP; Eggleston, DB
Flushed down the river: Consequences of
freshwater runoff to nursery habitat use of early
juvenile Atlantic croaker (SRA)

1:45: Jiménez-Rosenberg, Sylvia Patricia
Adelheid; Saldierna-Martínez, Ricardo;
Hernández-Rivas, Martín
First record of larval *Plagiotremus azaleus* (Jordan y
Bollman, 1890) (Pisces: Blenniidae) off Punta
Eugenia, B.C.S.

2:00: Humphreys, Robert L Jr
Variation in the occurrence of larval billfish off the
Kona coast of the Island of Hawaii

2:15: McBride, Richard S; Maki, Kristin L
Wahoo (Scombridae: *Acanthocybium solandri*)
larvae in the Gulf of Mexico SEAMAP collections

2:30: Gonzalez-Armas, Rogelio; Funes-Rodriguez,
Rene; Trasviña-Castro, Armando
Large pelagic fish larvae in the vicinity of a
seamount in the Gulf of California

2:45 – 3:15 Coffee break

Session moderator: Brenda Norcross

3:15: Klein-MacPhee, G; Keller, A; Erkan, D
Ichthyoplankton of Narragansett Bay, Rhode Island-
Changes over the last 30 years

3:30: Drass, DM; Lyczkowski-Shultz, J
Tilefish larvae of the genus *Caulolatilus* in the Gulf
of Mexico

3:45: Boeing, Wiebke J; Duffy-Anderson, Janet T;
Bailey, Kevin M
New metrics for ecosystem change: Bio-diversity
and dynamics of ichthyoplankton assemblages

Contributed papers (Media theater)

4:00: Ehrler, Chris; Carroll, Jay; Steinbeck, John
A comparison of the abundance of larval, young-of-the-year, juvenile, and adult marine fishes in central California.

4:15: Steinbeck, John; Ehrler, Chris; Hedgepeth, John
Effects of variation in larval duration on power plant entrainment impacts on larval fishes

4:30: Aoyama, Jun; Miller, Michael J; Tsukamoto, Katsumi
Contrasting spawning migrations and larval durations of temperate and tropical anguillid eels in the western Pacific region

4:45: Govoni, John Jeffrey; Laban, Elisabeth H; Hare, A Jonathan
The early life history of swordfish in the Western North Atlantic

Contributed papers (Experimental theater)

4:00: Miller, Michael J; Minagawa, Gen; Aoyama, Jun; Tsukamoto, Katsumi
Studies on leptocephali in the western Pacific and Indonesian Seas

4:15: Luthy, Stacy A; Cowen, Robert K; Serafy, Joseph E; McDowell, Jan R
Distinguishing larval sailfish, white marlin, and blue marlin from Western Atlantic waters **(SRA)**

4:30: Hyde, John R; Vetter, Russ
Fish & chips: genetic tools for identification of fish eggs and larvae **(SRA)**

4:45: Strydom, Nadine A
Current advances in ecological research on larval fishes associated with estuaries in South Africa.

THURSDAY 21 AUGUST

THEME SESSION: UNDERSTANDING DISPERSAL, SETTLEMENT, AND RECRUITMENT: GENETICS, OTOLITHS, PHYSICAL PROCESSES, AND APPLICATIONS

Session moderator: Steve Ralston

8:00: Caselle, Jennifer; Warner, Robert; Swearer, Stephen; Sheehy, Michael; Standish, Julie; Paradis, Georges

Towards establishing patterns of connectivity for marine populations: geographic structure in pre-release larval elemental signatures

8:30: Thorrold, Simon

Quantifying population connectivity in marine and anadromous fishes using geochemical signatures in otoliths

9:00: Secor, David H and Kraus, Richard T

Causes and consequences of divergent recruitment pathways in Chesapeake Bay white perch *Morone americana*

9:30 - 10:00 Coffee break

Session moderator: Mark Carr

10:00: Waples, Robin S

Insights into larval dispersal and recruitment using genetic markers

10:30: Botsford, Louis W

Larval fish dispersal and the design of marine reserves: recent developments in modeling and empirical approaches

11:00: Bailey, Kevin M; Ciannelli, L; Lankbury, JA; Duffy-Anderson, JT; Canino, MF; Wilson, MT

Spawning, dispersal, recruitment and stock structure of walleye pollock: some aspects of what we know and don't know

11:30 - 1:00 Lunch

Contributed papers (Media theater)

Session moderator: David Witting

1:00: Vetter, Russ; Buonaccorsi, Vince; Kimbrell, Carol; Lynn, Eric; Taylor, Cynthia

What can genetics tell us about larval dispersal?
Ten years with the nearshore rockfishes

Marine stock enhancement & fish culture (Experimental theater)

Session moderator: Ken Leber

1:00: Tanaka, Masaru

Is stock enhancement an effective tool for recovering reduced aquatic resources?

Contributed papers (Media theater)

1:15: Comyns, BH; Rakocinski, CF; Peterson, MS; Shiller, AM

Differences in otolith microchemistry of early juvenile spotted seatrout (*Cynoscion nebulosus*) reflect local geographic source areas across coastal Mississippi.

1:30: Martin, Gretchen Bath; Wuenschel, Mark
Comparison of minor and trace element incorporation in otoliths of *Leiostomus xanthurus* and *Lutjanus griseus*

1:45: Norcross, BL; Bailey, KM; Holladay, BA; Duffy-Anderson, J

Larval dispersal and settlement patterns of juvenile flatfishes in the Gulf of Alaska

2:00: Able, KW; Hagan, SMC; Brown, SA
Sources and sinks for *Fundulus heteroclitus* (mummichog) in salt marshes: Impact of invasive *Phragmites australis* (common reed)

2:15: Holt, Scott A

Nearshore distribution of red drum larvae between widely spaced tidal inlets along the Texas coast

2:30: Olney, JE; Hoffman, JC

Cohort dynamics of juvenile American shad (*Alosa sapidissima*) in the Pamunkey River, Virginia.

2:45 – 3:15 Coffee break

Session moderator: Ken Able

3:15: Morgan, Sian

Investigating planktonic dispersal in the tropical tiger-tailed seahorse, *Hippocampus comes* (SRA)

3:30: Standish, Julie

Defining the transport and sources of recently recruited rockfish (genes *Sebastes*) using otolith microchemistry (SRA)

Marine stock enhancement & fish culture (Experimental theater)

1:15: Drawbridge, Mark A; Curtis, Paul; Jirsa, Dave

Larviculture of marine finfish in southern California with special consideration toward stock enhancement applications

1:30: Ziemann, David A; Lotz, Jeffrey; Leber, Kenneth M

Growth and survival of cultured red snapper *Lutjanus campechanus* fingerlings released onto artificial reefs in the northern Gulf of Mexico: preliminary results.

1:45: Laidley, CW; Shields, RJ; Kotani, T; Molnar, A; Marion, K; Kobashigawa, J

Mass production of juvenile marine fish using intensively cultured copepods - a case study with *Parvocalanus* sp.

2:00: Ogle, JT; **Blaylock,** RB; Lotz, JM

Culture of red snapper, *Lutjanus campechanus* larvae

2:15: Tucker, John W Jr; Kennedy, Sarah Blain

Experiences with raising and stocking striped mullet (Mugilidae), sheepshead (Sparidae), common snook (Centropomidae), barramundi (Centropomidae), and Nassau groupers (Serranidae).

2:30: Barnett-Johnson, Rachel

Linking juvenile production sources to adult chinook salmon along the central California coast using otolith geochemical markers (SRA)

2:45 – 3:15 Coffee break

Session moderator: Masaru Tanaka

3:15: Holt, G Joan; Faulk, Cynthia

Culture of marine fish larvae for stock enhancement

3:30: Tanaka, Yosuke; Tominaga, Osamu; Tsusaki, Tatsuo; Tanaka, Masaru

Feeding performance of released Japanese flounder juveniles in relation to variability of food availability

Contributed papers (Media theater)

3:45: Marancik, Katrin; Hare, Jonathon; Clough, Lisa
Cross-shelf and seasonal variation in larval fish assemblages surrounding Gray's Reef National Marine Sanctuary (SRA)

4:00: Walsh, HJ; Marancik, KE; Hare JA
Linking larval fish distributions with juvenile settlement patterns on the Georgia shelf, USA (SRA)

4:15: Miller, JA; Shanks, AL
Evidence for limited larval dispersal in black rockfish (*Sebastes melanops*): Implications for population structure and marine reserve design (SRA)

4:30: Burford, Martha Overton
Genetic population structure and year-class formation in a nearshore species of rockfish (*Sebastes*) (SRA)

Marine stock enhancement & fish culture (Experimental theater)

3:45: Ralston, Steve; Grimes, Churchill
The feasibility of restoring depleted marine fish populations through stock enhancement

4:00: Leber, Kenneth; Brennan, Nathan
Are hatcheries replenishing or displacing wild stocks: assessing density-dependence in nursery habitats of a marine carnivore

4:15: Omar, Eglal; Zaki MM; Nour AA; Abdel-Rahim MM
Effect of stocking density on survival, growth performance, feed utilization and production of marine shrimp (*Penaeus semisulcatus*) in earthen ponds.

4:30: Nour, AM; Zaki MA; Nour AA; Abdel-Rahim MM
Factors affecting on swim-bladder inflation, survival, and growth performance of gilthead seabream (*Sparus aurata*) larvae: (1) rotifer (*Brachionus plicatilis*) uptake

FRIDAY 22 AUGUST

THEME SESSION: TRADE-OFFS AND COMPROMISES IN GROWTH PROCESSES OF EARLY LIFE HISTORY STAGES

Session moderator: Sue Sogard

8:00: Mangel, Marc

Models for early growth and its tradeoffs

8:30: Abrahams, Mark

How predators affect the behaviour and growth of fish

9:00: Arendt, Jeff

Delayed skeletal development as a cost of rapid growth in pumpkinseed sunfish

9:30 - 10:00 Coffee break

Session moderator: Marc Mangel

10:00: Conover, David; Arnott, Stephen

Trade-offs in the evolution of growth: lessons from the Atlantic silverside

10:30: Metcalfe, Neil B

Resource allocation, bad starts, and the long-term costs of catch-up growth

11:00: Johnsson, Jörgen I

The quest for the cost of growth: recent work on salmonid fish

11:30 - 1:00 Lunch

Contributed papers (Media theater)

Session moderator: Selina Heppell

1:00: Shoji, Jun; North, Elizabeth W; Houde, Edward D

Feeding, growth and mortality of white perch *Morone americana* larvae around the estuarine turbidity maximum of upper Chesapeake Bay: contrasting years

1:15: Hunt von Herbing, Ione

It's cool to be hot: Effects of temperature on the physics and physiology of swimming in marine fish larvae

Early life history of fishes in the San Francisco estuary and watershed (Experimental theater)

Session moderator

1:00: Sobczak, William V; Cloern, James E
Detritus fuels ecosystem metabolism but not metazoan foodwebs in San Francisco Estuary's freshwater Delta

1:15: Kimmerer, Wim J

Estuarine zooplankton as ecological filters

Contributed papers (Media theater)

1:30: Witting, DA; Chambers, RC

Growth-mortality trade-offs in a population of Atlantic tomcod (*Microgadus tomcod*) at the southern extreme of its geographic range

1:45: Arnott, Stephen, A; Conover, David O
Tradeoffs between growth and predation in the field: a comparison between eaten versus free-living silversides' otolith micro-structure.

2:00: Hurst, Thomas

Thermal effects on growth and behavior of juvenile northern rock sole.

2:15: Wuenschel, MJ; Jugovich, A; Hare, JA
Bioenergetics of juvenile gray snapper: effects of temperature and salinity on feeding, growth, and metabolism

2:30: Wada, T; Aritaki M; Tanaka M
Effects of low-salinity on the growth and development of spotted halibut juveniles with reference to prolactin and chloride cells responses

2:45 - 3:15 Coffee break

Session moderator: Rebecca Fisher

3:15: Pérez-Domínguez, R; Holt, Joan G
Environmental fluctuation in red drum (*Sciaenops ocellatus*) nursery habitat: effects of diel environmental cycles on larval growth and endocrine function (SRA)

3:30: Killen, Shaun S; Brown, Joseph A
Non-lethal effects of predatory threat on the growth and foraging activity of newly hatched ocean pout (*Macrozoarces americanus*) (SRA)

3:45: Jordaan, Adrian; Brown, Joseph A; Kling, Linda J
Are there risks involved in the fast growth of larval fish? (SRA)

Early life history of fishes in the San Francisco estuary and watershed (Experimental theater)

1:30: Bennett, William A

Is recruitment success of delta smelt *Hypomesus transpacificus* limited in the larval or juvenile stage?

1:45: Dege, Michael; Brown Larry R
Springtime trends in larval-juvenile fish distribution and abundance in the upper San Francisco Estuary

2:00: Feyrer, Frederick

Ecological segregation of native and alien larval fish assemblages in the southern Sacramento-San Joaquin Delta

2:15: Grimaldo, Lenny; Miller, Robert ; Peregrin, Chris and Hymanson, Zachary
Spatial and temporal distribution of ichthyoplankton across a subtidal horizontal gradient in the Sacramento-San Joaquin Delta

2:30: Hobbs, James; Bennett, William A
Assessing nursery habitat quality for native fishes in the low-salinity zone of the San Francisco Estuary (SRA)

2:45 - 3:15 Coffee break

Session moderator

3:15: Watters, Dianna; Brown, Howard M; Griffin, Fred J; Larson, Eric J; Cherr, Gary
Pacific herring *Clupea pallasii* spawning grounds in San Francisco Bay: 1973-2000

3:30: Griffin, FJ, Brenner, MF, Brown, HM, Smith, EH, Vines, CA; Cherr, GN
Survival of Pacific herring larvae is a function of external salinity

3:45: Bollens, Steve; Sanders, Alison
Ecology of larval Pacific herring *Clupea pallasii* in the San Francisco Estuary: Seasonal and interannual abundance, distribution, diet and condition

Contributed papers (Media theater)

4:00: Grorud-Colvert, KA; Sponaugle, S
Predation in marine protected areas: effects on growth and survivorship of newly-settled coral reef fishes **(SRA)**

4:15: Green, Bridget S; Fisher, Rebecca
Temperature induced plasticity influences whether bigger is really better

4:30: Nakayama, Shinnosuke; Masuda Reiji;
Tanaka Masaru
Development of schooling behavior in chub mackerel *Scomber japonicus* with emphasis on dietary condition and social transmission **(SRA)**

4:45: Lemberget, Tove; McCormick, Mark I;
Wilson, David T
Assessment of the growth-mortality hypothesis in a tropical larval fish: a field study **(SRA)**

Early life history of fishes in the San Francisco estuary and watershed (Experimental theater)

4:00: Jahn, Andy; Amdur, Jon; Zaitlin, Jody;
Elliott, Meredith
Summertime habitat associations of age-0 silversides at Alameda Point, San Francisco Bay

4:15: Rockriver, Andrew CC
Vertical distribution of larval delta smelt and striped bass near the confluence of the Sacramento and San Joaquin rivers

4:30: Nobriga, Matthew L; Matica, Zoltan;
Hymanson, Zachary
Evaluating entrainment vulnerability to agricultural irrigation diversions: a comparison among open water fishes

SATURDAY 23 AUGUST

THEME SESSION: MATERNAL EFFECTS ON OFFSPRING PERFORMANCE: WHAT DOES MOM HAVE TO SAY?

Session moderator: Steve Berkeley

8:00: Chambers, R Chris

An overview of maternal effects in fish populations and their potential role in fisheries ecology and aquaculture

8:30: Fleming, Ian A; Einum, Sigurd

Maternal influences on optimal values for fish eggs

9:00: Berkeley, Steven A; Sogard, Susan M, Fisher Rebecca

Effect of maternal age on larval rockfish growth and mortality

9:30 - 10:00 Coffee break

Session moderator: Ian Fleming

10:00: Clemmesen, Catriona; Buehler, V; Carvalho, G; Case, R; Hauser, L; Hutchinson, WF; Kjesbu, OS; Moksness, E; Otteraa, H; Paulsen, H; Svaasand, T; Thorsen, A

How long is the maternal effect still visible? - a study on cod (*Gadus morhua*) using parental identification techniques

10:30: Marteinsdottir, G

Can we improve stock recruitment relationships by including maternal effects?

11:00: Palace, VP; Werner J

Deposition of lipid soluble antioxidant vitamins to eggs and their importance for fish embryonic development

11:30 - 1:00 Lunch

Contributed papers (Media theater)

Session moderator: Ed Rutherford

1:00: Alvarez, María del Carmen; Fuiman, Lee A
Effects of the herbicide Atrazine on larval red drum, *Sciaenops ocellatus*, environmental performance (SRA)

1:15: Green, Bridget S; McCormick, Mark I; Anthony, Kenneth RN
Variation in size has maternal and environmental origins (SRA)

Early life history of fishes in the San Francisco estuary and watershed (Experimental theater)

Session moderator:

1:00: Marchetti, Michael; Esteban, Elaine; Limm, Michael; Kurth, Ryon
Evaluating aspects of larval light trap bias and specificity in the Northern Sacramento River system: Do size and color matter?

1:15: Foss, Stephen F; Miller, Lee W
Growth and growth rate variability of larval striped bass *Morone saxatilis* in the San Francisco Estuary

Contributed papers (Media theater)

1:30: Hoffman, Joel C; Bronk, Deborah A; Olney, John E Sr
Determining essential habitat for American shad (*Alosa sapidissima*) in the York River, VA using stable isotope analysis (SRA)

1:45: Nye, Janet A; Davis, Dawn D; Miller, Thomas J
Maternal effects in *Fundulus heteroclitus* larvae exposed to contaminated sediment (SRA)

2:00: Oskarsson, Gudmundur J; Taggart, Christopher T; Stephenson, Robert L
Maternal effects on recruitment of Icelandic summer spawning herring (*Clupea harengus* L.) (SRA)

2:15: Takeda, Yuho; Wada, Toshihiro; Aritaki, Masato; Tanaka, Masaru
Ontogenetic development of freshwater adaptability in closely related flatfish: starry flounder *Platichthys stellatus*, stone flounder *P. bicoloratus* and their hybrids (SRA)

2:30: Buehler, V; Moksness, E; Clemmesen, C; Hutchinson, WF
Born to be a winner? Characteristics of survivors inferred by the otolith microstructure of Norwegian arctic cod (*Gadus morhua* L.) (SRA)

2:45 – 3:15 Coffee break

Session moderator: Eric Bjorkstedt

3:15: Fuiman, Lee A; Cowan, James H., Jr; Rose, Ken A; Smith, Eric P
The final event of the larval fish olympics: behavioral attributes and survival potential of red drum larvae

3:30: Heppell, Selina S
Models to explore the role of maternal effects on population dynamics of exploited species

Early life history of fishes in the San Francisco estuary and watershed (Experimental theater)

1:30: Mager, Randall C; Doroshov, Serge I; Van Eenannaam, Joel P; Brown, Randall
Early life stages of delta smelt *Hypomesus transpacificus*

1:45: Baskerville-Bridges, Bradd L; Lindberg, Joan; Doroshov, Serge I
The effect of light intensity, alga concentration, and prey density on the feeding behavior of delta smelt *Hypomesus transpacificus* larvae

2:00: Kuivila, Kathryn; Moon, G Edward
Dissolved pesticide concentrations in larval delta smelt *Hypomesus transpacificus* habitat in the Sacramento-San Joaquin Delta, California

2:15: Riley, Frank; Owen, Julie; **Finlayson**, Brian
Effects of herbicides used to control water hyacinth and Brazilian waterweed on delta smelt *Hypomesus transpacificus* larvae

2:30: Teh, Swee J; Zang, Guo Hua; Kimball, Tom; Teh, Foo Ching
Lethal and sublethal effects of esfenvalerate and diazinon on splittail *Pogonichthys macrolepidotus* larvae

2:45 – 3:15 Coffee break

Session moderator

3:15: Crain, Patrick K; Whitener, Keith; Moyle, Peter B
Use of a restored central California floodplain by larvae of native and alien fishes

3:30: Sommer, Ted; Harrell, William C; Kurth, Ryon ; Feyrer, Frederick; Zeug, Steven O'Leary, Gavin
Ecological patterns of larval fish assemblages in a large river-floodplain of the San Francisco Estuary

Contributed papers (Media theater)

3:45: Bond, PJ; Lyczkowski-Shultz, J
21st Century Larval Illustrations

4:00: Busby, Morgan S; Blood, Deborah M;
Nichol, Daniel G
Spawning and development of eggs and larvae of
the bigmouth sculpin *Hemitripterus bolini*
(Scorpaeniformes: Hemitriptoridae)

4:15: Islam, Asiful; Khasanova MA; Chernov
VM; Kuznetsov VA
Blood serum and muscle proteins analyses of
the pike perches population in the upper
Kuibyshev water reservoir of Russia

Early life history of fishes in the San Francisco estuary and watershed (Experimental theater)

3:45: Seesholtz, Alicia; Cavallo, Bradley;
Kindopp, Jason; Kurth, Ryon; Perrone,
Michael
Lower Feather River juvenile fish communities:
distribution, emigration patterns, and association
with environmental variables.

4:00: Titus, Robert G; Volkoff, Martha C; Snider,
William M
Use of otolith microstructure to estimate growth of
juvenile Chinook salmon from a Central Valley,
California stock

4:15: Williams, John G, Vyverberg, Kris; Horner,
Tim; Merz, Joe
The hyporheic environment of larval chinook
salmon *Oncorhynchus tshawytscha* in Central
Valley streams